

A photograph of a military vehicle, specifically a 7GP 24T truck, being transported on a flatbed railcar. The truck is positioned horizontally across the frame, with its front facing towards the right. It is secured with yellow straps and has two yellow chain hoists attached to its front. A white placard on the front of the truck reads "7GP 24T". The railcar is a standard flatbed type, and the background shows a rural landscape with trees and a clear sky.

# UMODPC RAIL OPERATIONS

UMODC01



## References

**FM 3-35.4, Deployment Fort-To-Port**

**FM 4-01.011, Unit Movement Operations**

**FORSCOM/ARNG Regulation 55-1, Unit Movement Planning**

**TM 55-2200-001-12, Application of Blocking, Bracing, Tiedown Materials for Rail Transport**

**TEA PAM 55-19, Tie-Down Handbook for Rail Movements**

**TB 55-46-1, Standard Characteristics for Transportability of Military Vehicles and Other Outsize/Overweight Equipment**



# Surface Transportation



- What if unit equipment is non-roadable?.... or is beyond organic lift capability?

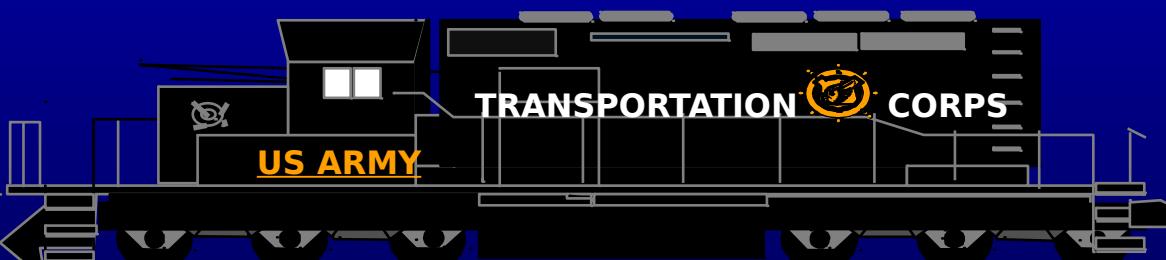


...Then you must depend upon commercially provided service ....  
..... like rail!



# Responsibilities -- General

- The deploying unit & installation both have planning and execution responsibilities for major rail activities
  - Rail loading/unloading Restraining Material
  - Rail site preparation
  - Rail car inspection





# Unit

## Responsibilities

- **Unit commander** overall responsibility for preparing unit for rail operations
- Major unit responsibilities:
  - Prepare rail movement **plan**
  - Submits **movement requirements** to the ITO (AUEL to DEL/OEL to UDL)
  - Prepare **equipment** for rail movement
  - **Load** railcars (under the technical supervision of the UMC)



# Unit Responsibilities (Cont)

- Specific responsibilities:
  - Appoint an **OIC** for the rail operation
  - Designate **safety officer**
  - Coordinate with Director of Public Works for blocking and bracing material
  - Provide trained **load teams**



# Unit Responsibilities (Cont)

- Ensure vehicles are **properly prepared/configured**
  - Removing canvas and bows
  - Securing moving vehicle parts
    - Packing, crating, banding, and blocking and bracing secondary loads
- Use FORSCOM/ARNG 55-1 & SDDCTEA Pam 55-19
- Coordinate logistical support for railhead ops
  - Lighting, latrines, mess, and medical



## Unit Responsibilities (Cont)



- Ensure tie-down teams have proper equipment
- Stage equipment
- Ensure sufficient numbers of cars are spotted
- Inspect rail cars
- Conduct safety briefings
- Prepare rail cars for loading
- Load and tie-down equipment on rail cars
- Provide all required HAZMAT documentation to ITO



# Installation Transportation Office Responsibilities

- **Orders rail cars** based on the deploying unit's requirements
- **Computes railcars** based on the shipping configuration of the equipment (need accurate DEL/UDL) and prepares
- **Official liaison** with SDDC and the railway
- ~~Designates Railcar staging~~ **Designates Railcar loading** ad-out staging area
- **Joint Inspection** of railcars with railroad rep (for serviceability) prior to loading commencing
- Provides **technical advice** to units on blocking, bracing and tie down material



# Installation Transportation Office Responsibilities (Cont)



- Provide spanners as required
- Notifies the Unit on type and quantity of railcars, and railcar arrival schedule (cognizant of scheduled arrival date as POE - as listed in TPFDD)
  - Publishes/maintains rail loading schedule according to the movement order/directive
  - Joint inspection or loaded railcars with railway agent to ensure compliance with Army Regulations, AAR loading rules, or host nation rail rules
  - Provides DD Form 836, if necessary for HAZMAT



# Director of Public Works (DPW)

- Provides B & B materials for deploying units
- Deploying units must determine requirements & provide in advance to the DPW.
- Provides tools, potable end loading ramps and assistance as required





# SDDC Responsibilities

- Obtaining the railcars and the routing from the railroad that is supporting the move. Advises ITO of route restrictions (height or weight)
- Units can request assistance through the SDDC Operations Center at Fort Eustis, VA
- Unit Movement Teams from Deployment Support Brigades (USAR) are available to be dispatched to support unit preparation for movement
- Request SDDC assistance through the UMC/ITO



# Rail Carrier Representative Responsibilities

- Joint inspection with ITO rep before cars
- positioned at loading ramp
- Inspection following railcar loading to ensure:
  - Loaded railcars comply with AAR rules
- Final approval authority for accepting the rail loads



# OCONUS RAIL OPERATIONS



- **A Movement Control Team (MCT)** normally performs the functions associated with the installation (ITO [ordering railcars, liaison with HN railway agent, inspection of railcars, technical advice etc])
- **Area Support Group or Base Support Battalion** provide blocking and bracing material and tools/assistance as required
- Unit determines movement requirements and submits them to the MCT
- Deploying unit prepares equipment (cleans and configures) - cognizant or pertinent regulations if required
- **Unit** - unit of railcars - and loads



# OCONUS RAIL OPERATIONS

## (cont)



- MCT unit manages railhead ops in the marshaling and staging areas
- Deploying units provide drivers, tie-down teams, safety monitors, and other support personnel as directed
- Deploying unit documents its equipment and personnel for rail transport
- MCT unit consolidates and coordinates all rail movement with other en route nations and the carrier
- When rail is the primary means of deployment,



# Rail Load Planning



- TC-ACCIS/TC-AIMS II provides automated rail load planning capability
- Use FORSCOM Form 285-5-R for manual load planning



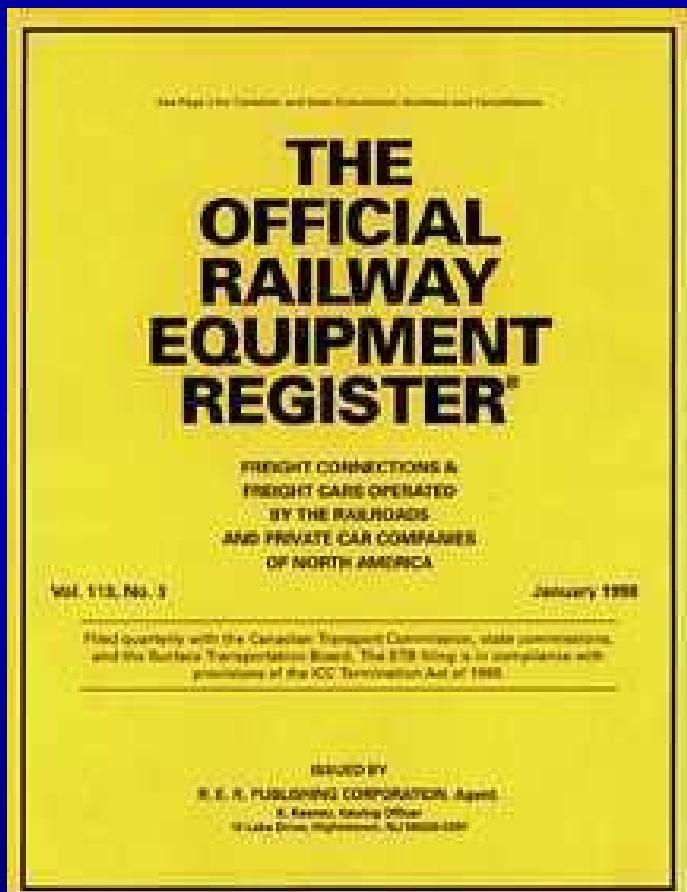
# Railcar Requirements

- Rail cars are obtained by ITO in the types and quantities required, based upon the deploying unit's requirements
- Deployment may be by commercial or 'DODX' railcars





# The Official Railway Equipment Register



- The Official Railway Equipment Register is used to determine the type of rail cars needed, and their associated capacity and
- Excerpts for Trailer Train & DODX railcars contained in TM 55-2200-001-12



# TM 55-2200-001-12



- TM 55-2200-001-12 (Appendix H-1), contains DODX table used to determine the types of DODX rail cars needed, and their associated dimensions.

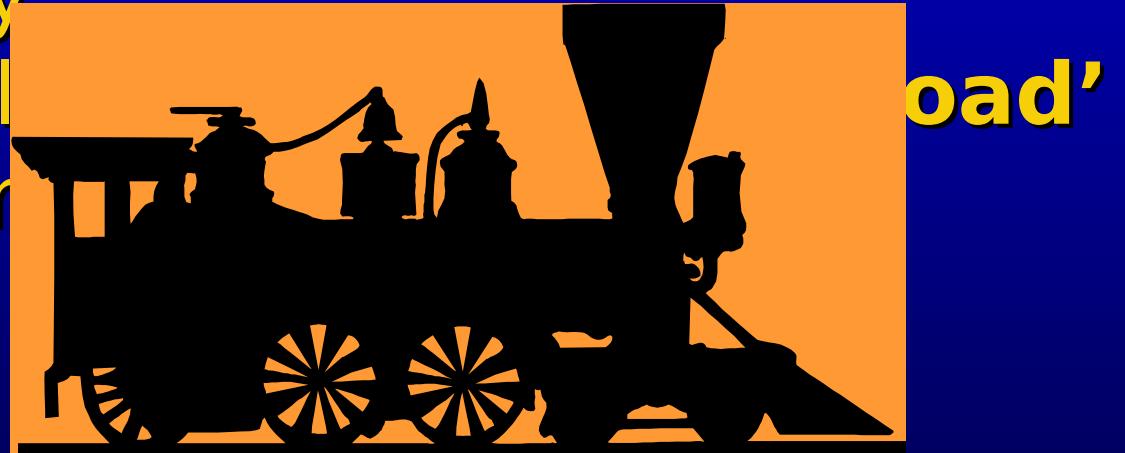
DEPARTMENT OF DEFENSE, MILITARY TRAFFIC MANAGEMENT COMMAND-WASHINGTON, D.C. 20315.																				
Reporting Marks and ACI Nos.—DODX - 1 158																				
GENERAL OFFICES: Headquarters, Military Traffic Management Command, Eastern Area, Attn: MTERNR-M, Military Ocean Terminal, Bayonne, NJ 07002 (201)823-6411-6412-6413																				
FREIGHT EQUIPMENT																				
Cars are marked "DODX" and are numbered and classified as follows:																				
L i n n Hs	A.A.R. Mech. Desig. No.	DESCRIPTION	A.A.R. Car Type Code	NUMBERS	DIMENSIONS												CAPACITY			
					INSIDE			OUTSIDE			DOORS			Cubic Feet Level Full	Lbs. (000)	No. of Cars				
Length ft. in.			Width ft. in.			Height ft. in.			At Eaves or Top of Sides or Platforms ft. in.			Extreme Width ft. in.					To Eaves or Top of Sides or Platforms ft. in.			
See Explanation Pages for Abbreviations & Symbols			*Change from Previous Issue			ft. in.			ft. in.			ft. in.			ft. in.			ft. in.		
DODX																				

- TM 55-2200-001-12 (Appendix G), contains information on commercial special-purpose railcars



# Types of Trains

- **Carloads** (part of carrier regular train service) - average speed of 13 mph or 312 miles per day
- **Unit train** - additional train
  - If not carrying dimensional (high/wide loads) use an average speed of 22 mph or 528 miles per day
  - For dimensional loads use the 'road speed' for planning





# Railcars

- There are several **types of railcars** used for military exercises and deployments

- **Open** Top Cars

- + Flat Cars

- + Gondolas





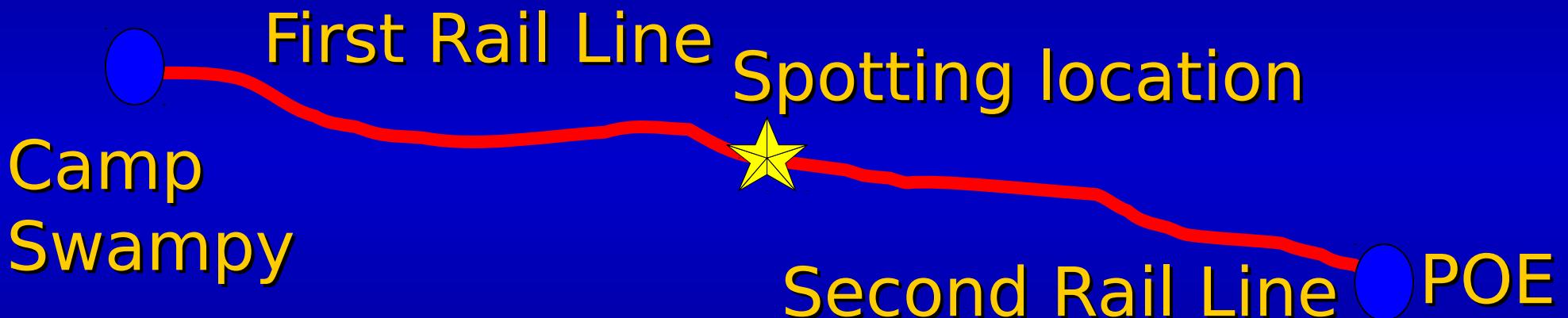
# Railcars (Cont)

- Closed Cars
  - + Box car
- Specialty Cars
  - + Multilevel
  - + Heavy lift
  - + TOFC
  - + COFC





# ITO Requests Rail Routing from SDDC



SDDC obtains routing from rail  
company selected

# SUMMARY



A group of military personnel in hard hats and safety vests are standing near a large military truck and a yellow railcar. One soldier is standing on the truck's bed. The text 'QUESTIONS ???' is overlaid in large yellow letters.

**QUESTIONS ???**



# On Learning

# RAILWAY FACILITIES AND EQUIPMENT



# RAILWAY FACILITIES





# Railyards & Tracks



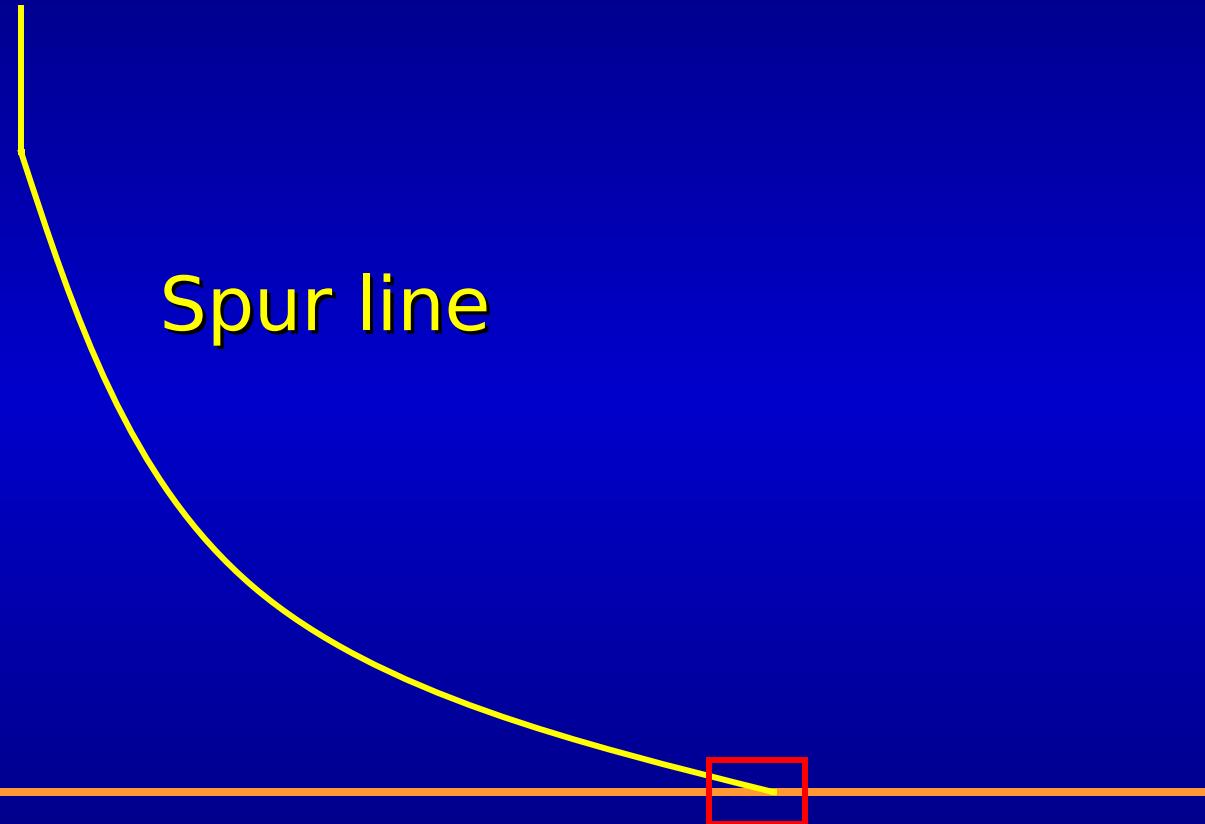


# Sidings





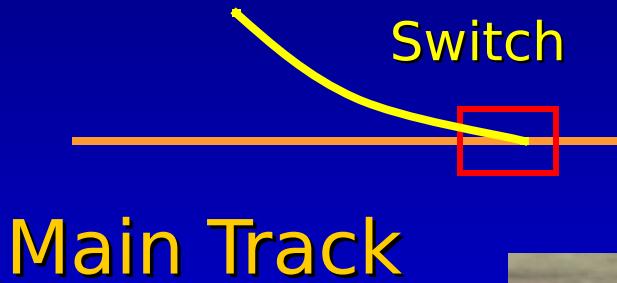
# Spur



= Switch

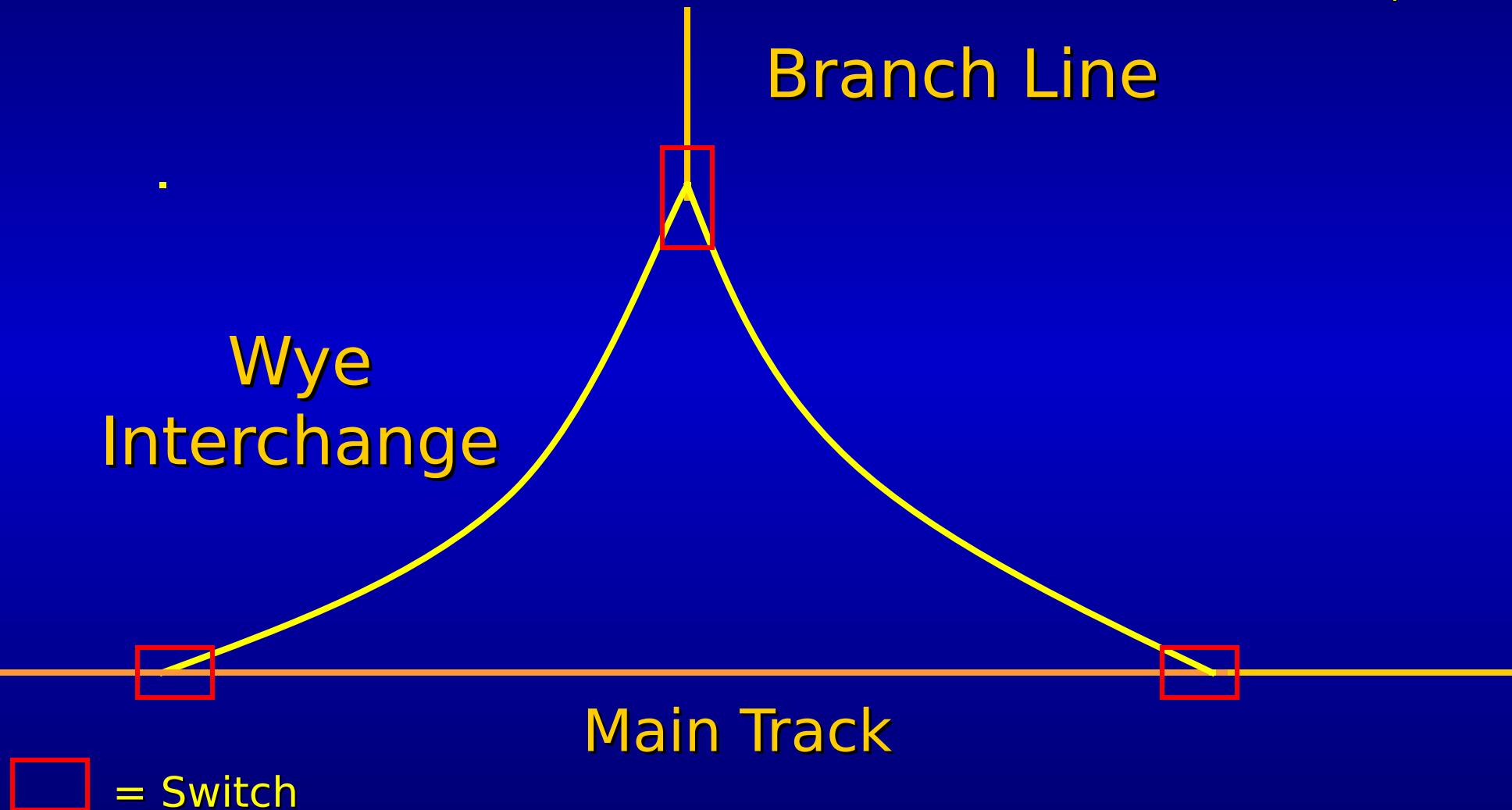


# Switch



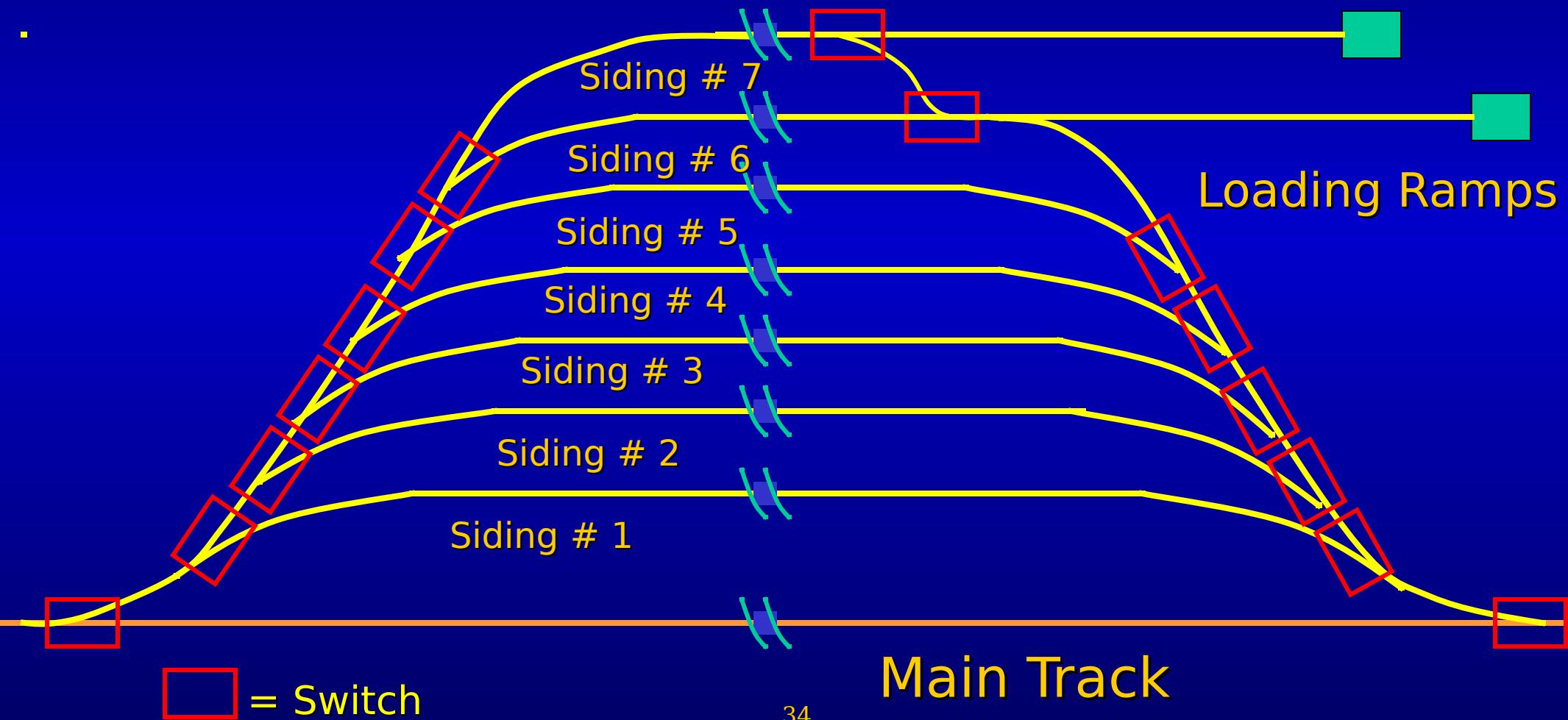


# Wye Layout





# Combination Yard Layout





# Hank's Yard (FEVA)





# Interchange

- **Interchange point** - area where trains are handed off to other carrier

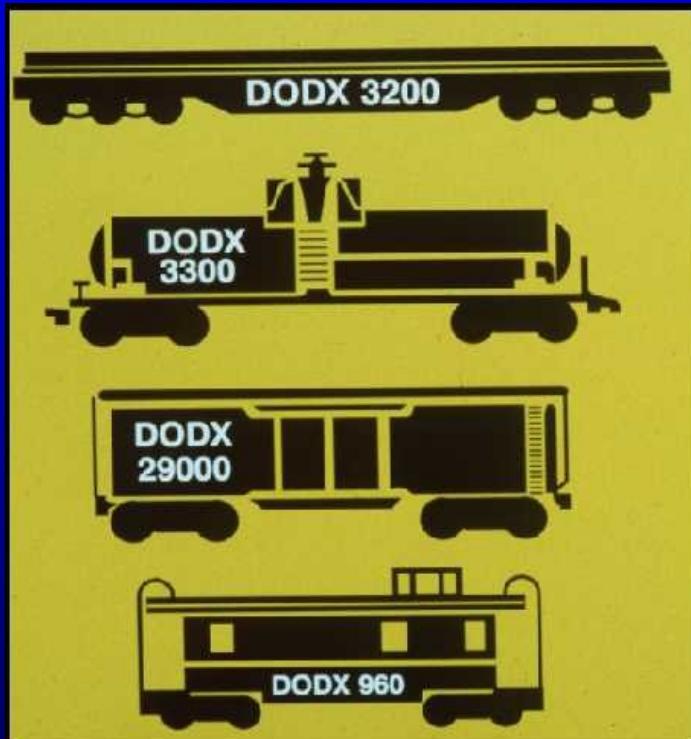




# Defense Freight Rail Interchange Fleet (DFRIF)



- Mainly used for over-dimensional equipment or to meet deployment time constraints



## Flatcars:

General Purpose  
1477

Special Purpose  
~~159~~

## Tank cars:

General Purpose  
375

Special Purpose  
~~18~~

Special Purpose  
30

Refrigerated  
~~9~~

Misc cars: Escort Cabooses 6

Guard Cars 5

Spec Lease

11  
TOTAL DODX: 2070



# ASMP Railcar Requirements



- Part of DFRIF - sited at PPPs to support rapid deployment (restrictions on use)
- DA DCSOPS sets priority on which installation get railcars first.

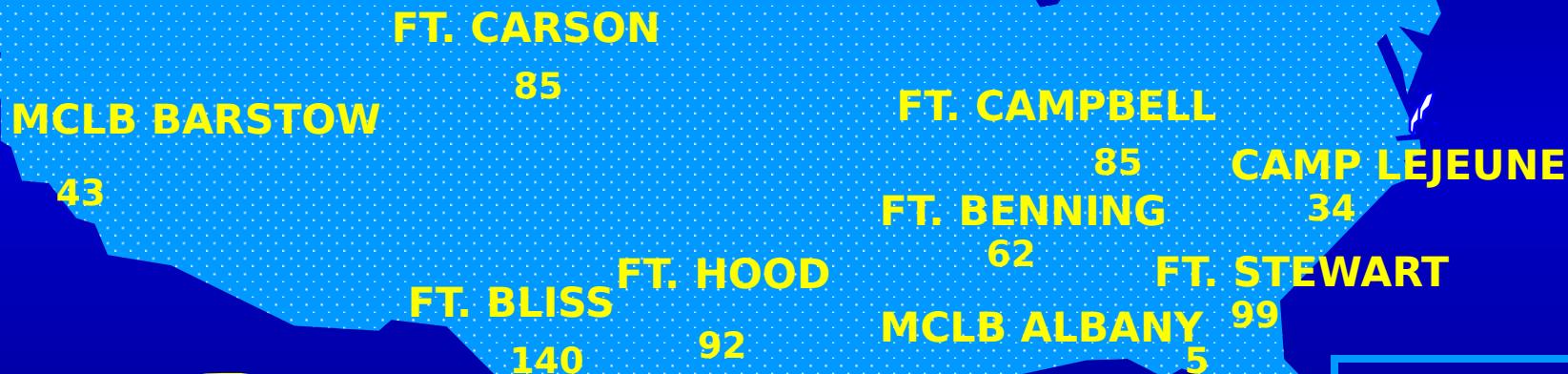
- Ft Stewart	233
- Ft Hood	185
- Ft Carson	85
- Ft Campbell	236
- Ft Benning	62

AMCCOM Installations:  
198 cars at  
12 Ammo Plants



# SDDC Managed Railcars

Total rail fleet: Approximately 2,070



566 -140 TON FLAT RAILCARS  
335 -100 TON FLAT RAILCARS  
\* PRE-ASSIGNED IN ORDER TO  
RESPOND TO CONTINGENCIES



RAIL FLEET:	
TANK CARS:	375
FLAT CARS:	1,477
BOX CARS:	30
REEFERS:	9
CABOOSES:	6
SCHNABEL:	2



# Railway Equipment





# Flat Cars

- Ideal for transporting military cargo and vehicles
- Equipment may be carried on DOD or common carrier flatcars





# DODX 40000 Series 68' Flat Car



- 40000 Series
  - 140 Ton Capacity
  - Only DODX railcar to move M1A1





# DODX 41000 Series 68' Flat Car

- 41000 Series
  - 85-100 Ton
  - Most have spanners, chains & container pedestals





# DODX 42000 Series 89' Flatcar

- 42000 - Series
  - 85 -100 ton capacity
  - Used for wheeled, light tracked vehicles & containers
  - Chain tie-down with lift up container pedestals





# DODX 42000 Series 89' Flatcar (Cont)



- Some have no integral spanners



# Conventional Flat Cars

- Wire rope tie-down
- Block & brace
- Stake pocket sides





# Chain Tie-down Flat Cars

- Wooden or steel deck
- Center or center and





# Types of Flat Cars



- Flatcars without side rails are easier to load, and wider vehicles more easily accommodated



# Bi-Level Flat Cars



- Taller vehicles on upper level





# Multilevel Flat Cars

- Ramps are used to load the upper levels
- Small wheeled vehicles, protected





# Trailer on Flatcar (TOFC)





# Container on Flatcar (COFC)





# MHE Support (TOFC)





# Boxcars

- US Boxcars in domestic service have a capacity of about 100k lbs., or over 3900 cu feet.
- Ideal for commodities requiring protection from weather or susceptible to pilferage: foodstuffs, medicines, electronics, spare





# Tank Cars





# Gondola Cars

- If car sides are necessary to keep bulk loads from shifting, use gondola cars

Conex





# Hopper Cars

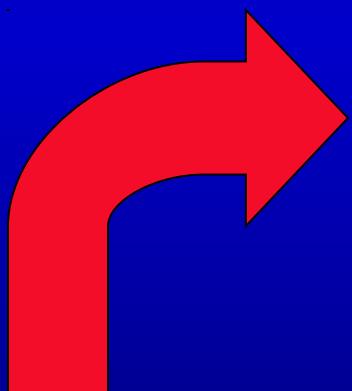
- Cars can be either covered or open at the top
- Used for transporting loose bulk commodities like gravel and coal





# Switch Engines

- Used to switch rail cars in and out of a loading area.





# Line Haul Locomotives





# Caboose

- Not used on civilian trains
- Only used when escort required



# SUMMARY



# QUESTION S ???





# On Learning

# Rail Loading Requirements and Procedures





# Preparing Unit Equipment for Rail Movement

- The deploying unit is responsible for preparing its vehicles and equipment for rail movement





# General Guidance



- Don't carry ammunition and fuel (as a secondary cargo) together on any vehicle of a rail movement
- Place warning placards on all sides of hazardous cargo loads
- Load unit equipment in organic vehicle to the greatest extent possible. Secure equipment loads properly
- Lock and seal sensitive materials



# Preparing Vehicles Prior to Loading

- **Vehicle Preparation Requirements:**

All lifting and tiedown  
shackles attached

~~Vehicle~~ Fuel tanks no  
more than 3/4 full

Canvas and bows  
removed or banded

Check all tire inflation and  
condition





# Preparing Vehicles Prior to Loading (Cont)



- Old series vehicles (eg HMMWV) roll down side windows, lower windshields, turn mirrors inward
- New series vehicles (eg PLS, HET, HEMTT) windows must remain up because of potential rail damage to electronic transmission and central tire inflation systems. Protect with plywood, cardboard or double layer of bubble wrap
- Do not cover headlights, windshields or mirrors with tape



TTDX 930456

CAPY 1300  
\* LD LMT 135



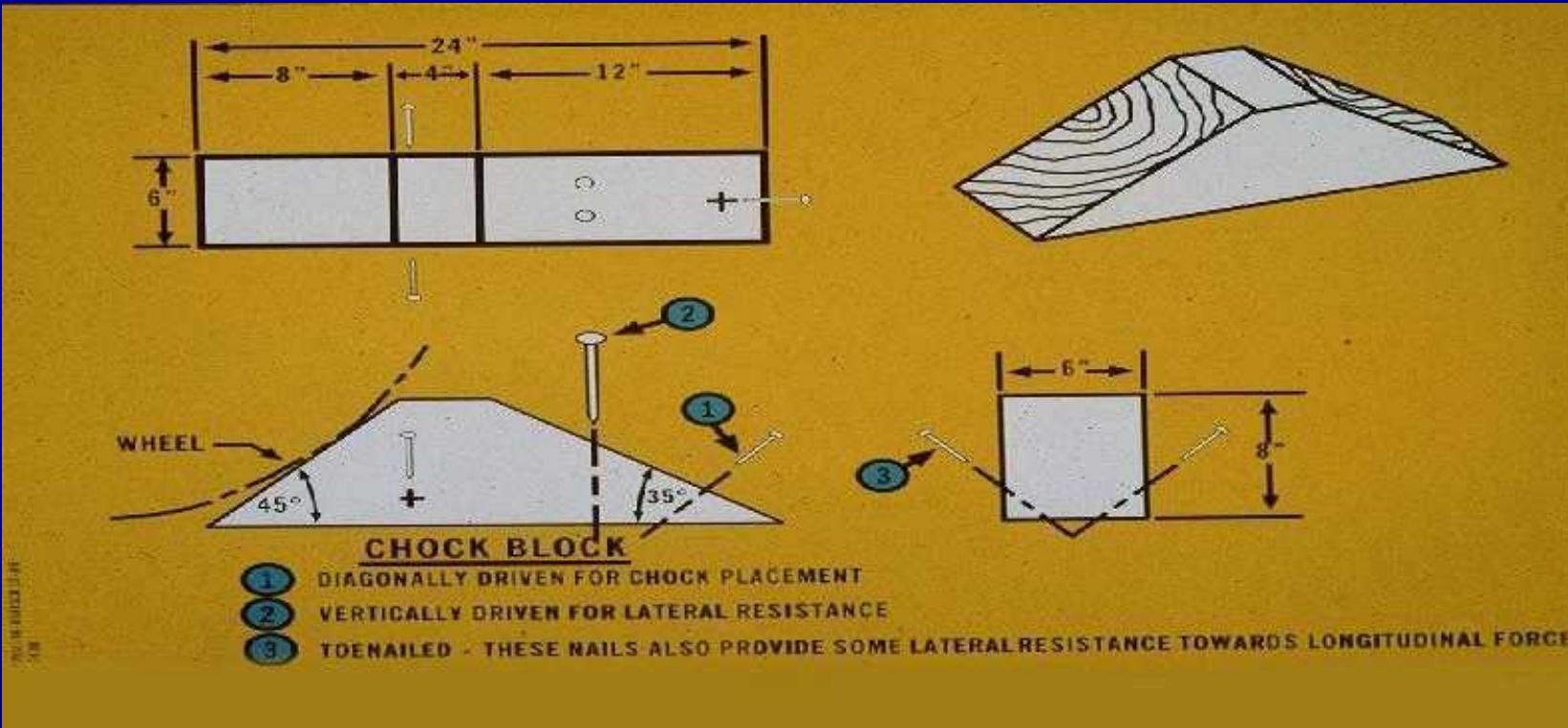
# Preparing Vehicle Prior to Loading (Cont)

- Reduce vehicle configuration based on information contained in movement
- ~~Secure~~ any materials or equipment
- Bands must be approved by AAR.
- Ensure that hood latches are functional and secure.





# Blocking and Bracing Materials



- Blocking & bracing references contained in both TM 55-2200-001-12 & SDDCTEA Pam 55-19



# Rail Site Facilities



Lighting

Medical support





# Rail Site Facilities (Cont)

- Command and control facilities

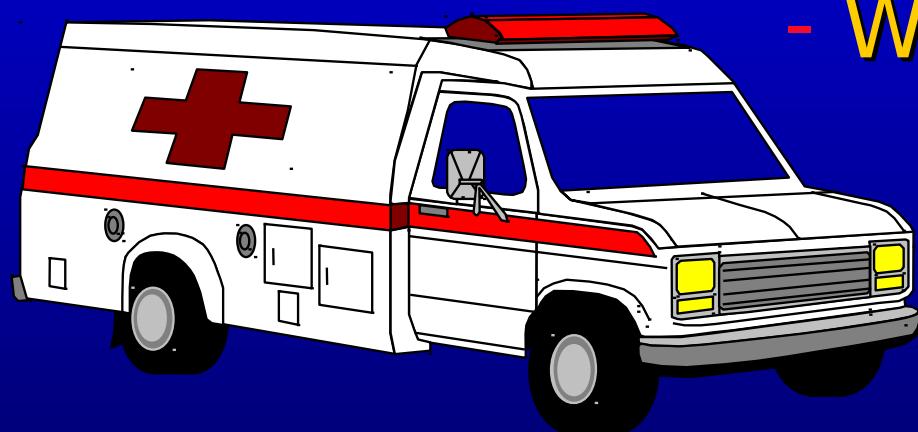
- Lighting

- Latrine facilities

- Warming Tent

- Messing

- Medical support





# Safety Requirements

- Appoint Safety OIC or NCOIC and OIC conduct risk assessment before commencing loading
- Qualified and properly equipped medical personnel on site
- Brief all soldiers on established safety procedures prior to loading commencing:
  - All loading personnel MUST wear leather gloves and hard hats/helmets. Goggles and safety boots are also required
  - For night loading ops, ensure adequate lighting and that personnel have reflector vests and flashlights
  - Personnel will not jump between or from railcars - use steps provided (running on railcars is also prohibited)
  - Do not crawl under or walk between railcars
  - Do not step or walk on the rails



# Safety Requirements (Cont)

- Never walk backwards on rail cars
- All vehicles being loaded/unloaded on a railcar must have a car guide (on the rail car in front of the vehicle) and two side guides (one on the ground on each side of the vehicle being
- Only the car guide gives instructions to the vehicle driver - side guides keep car guide advised of how close the vehicle is to the edge
- Car guides escort vehicle onto ramp and railcar and must stay in clear view of the driver at all times



# Safety Requirements (Cont)

- Car guide should stay one railcar ahead of the vehicle being guided. If a vehicle is already on railcar assume a secure and observable position on or beside the parked vehicle so that you cannot be pinned between the moving and parked vehicles
- Car guides must use uniform hand signals (drivers must <sup>6</sup> also understand these signals)





# Safety Requirements (Cont)

- Ensure spanners are properly aligned, set and secured before a vehicle drives over them. However, do not stand beside spanners when a vehicle is driving over them
- Reduced speed is used when driving vehicles onto railcars
- Personnel stay clear of main track and railcars when vehicles are moving on them (unless a designated guide)
- No sleeping in or around rail cars
- Be aware of overhead electric power lines
- Display a blue flag on the track behind the last car being loaded so that other vehicles know to stop.



# Rail Site

- Rail site must be clean and free of debris.
- Ensure spanners are available.
- Ensure that MHE is on site for equipment that requires MHE support





# Inspection of Railcars



- Rail cars are inspected prior to being positioned at final loading locations
- Purpose of inspection is to determine the cars suitability for the intended equipment/vehicle loads
- After railcars are accepted, Military accepts full responsibility to comply with AAR rules



# Inspection of Railcars (Cont)

- Deploying unit and ITO representative inspect railcars prior to loading equipment. Checks include:
  - Doors on closed cars open and close and interior is free of debris
  - Open car decks are free of residue and old blocking & bracing materials
  - Chains are present and serviceable on chain rail cars

# CONUS GENERAL RAIL LOADING RULES





- Excerpts of AAR Rules contained in TM 55-2200-001-12
- Contains Tie-down Information for Mil Vehicles & Equip
- Abide by host nation rail rules and regs OCONUS

TM 55-2200-001-12

TECHNICAL MANUAL  
TRANSPORTABILITY GUIDANCE  
APPLICATION OF BLOCKING, BRACING,  
AND TIEDOWN MATERIALS  
FOR RAIL TRANSPORT

This copy is a reprint which includes current pages from Changes 1 through 4.

HEADQUARTERS, DEPARTMENT OF THE ARMY

MAY 1978



# AAR Loading Rules



- The AAR makes no provision to protect cargo from the elements or other forms of damage





# AAR Loading Rules (Cont)

- The loading rules are applicable to both the railroad and the ITO/Unit.
  - ① Railcar load and weight limits must not be exceeded



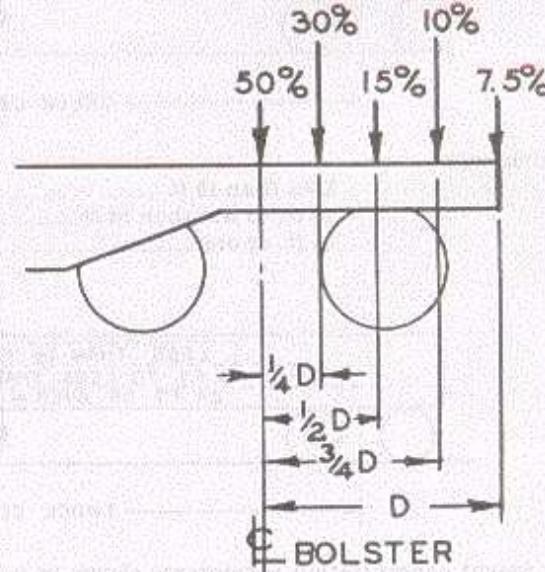
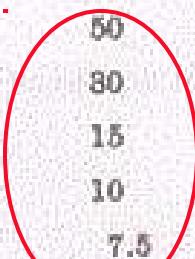


# AAR Loading Rules

## (Cont)

I **One-half the load limit of the railcar must not be exceeded on any axle**

Permissible Concentrated Load  
Percent of Stenciled Load Limit



SKETCH 2

LOAD CONCENTRATED AT SPECIFIC POINTS



# AAR Loading Rules (Cont)



- Balance load evenly on car
- When loading large and heavy items not covered by rules, load largest dimensions and heaviest weight on the floor to prevent tipping
- Items having a high center of balance (CB) must be secured to prevent tipping while in transit



# AAR Loading Rules (Cont)



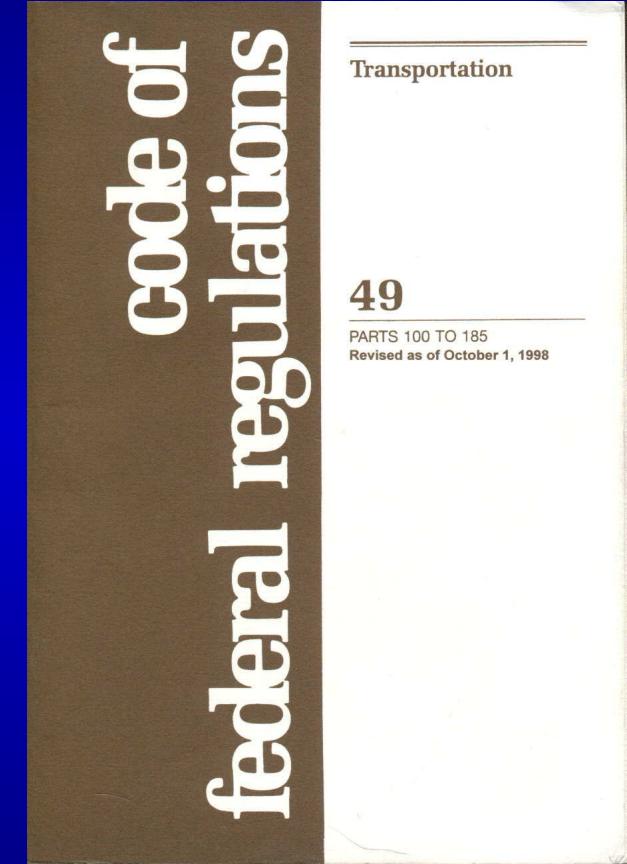
- Loads must be adequately secured to the railcars
- Railcars must be suitable for the safe transportation of the load, and the load must not exceed the width and height restrictions over the proposed route



# HAZMAT



- IAW Title 49, CFR and DTR Part II
- Consider exclusions, marking and placards
- If exemption required SDDC will request from carrier
- Carrier provides certificate needed for movement of Class 1 explosives
- Rail cars used for shipment of explosive must be properly sealed with an Army approved seal





# SENSITIVE/CLASSIFIED MATERIAL



- When shipping sensitive or classified material by rail, commanders may be required to provide guards or escorts
- Cargo guards and escorts maintain surveillance over the military equipment during the journey and notify railroad personnel of any problems
  - Escort supervisor given copy of trip itinerary (interchange points, stops etc)
  - Escorts have portable radios and are given safety and ROE briefs prior to departure



# ESCORT/GUARD DUTIES



- Detailed in Appendix A of FM 4-01.011, *Unit Movement Operations*
- Conduct cargo check one to two hours before departure
  - Cargo checks whenever train stops for 30 minutes or more (check for cargo shifting, tampering [eg, missing seals], and missing or damaged cargo)
- During stops guards staggered along both sides of the train
  - Incident reports to SDDC, immediately, for incidents that could delay a shipment en route





# Preparation of Railcars

- Deploying unit check chain tie-downs and positions them on the railcar deck to avoid having to reposition chains after vehicle are loaded.
- Unused chains are placed in the channels to prevent them being damaged.
- Ensure railcar brakes are applied and chock rail wheels to prevent the railcars shifting



# Vehicle and Equipment Loading

- Prior to loading, stage vehicles in the order they will be loaded
- Most common and expeditious method for loading vehicles on flatcars is the “circus” method. Flatcars equipped with spanners used as roadbed (spanners adjusted as required for each vehicle type)
  - All vehicles loaded on rearmost car, then moved forward to



# Vehicle and Equipment Loading (Cont)

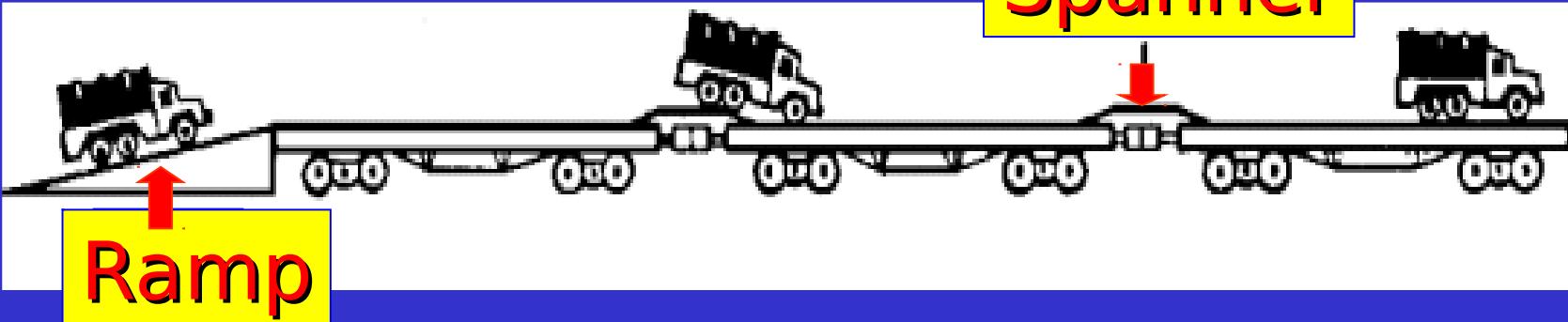


Vehicles being loaded by the “circus” method



# Loading

- Prior to loading the vehicle onto railcar, all personnel with the exception of the driver must dismount vehicle



- Rail guide should be one car ahead of vehicle or positioned not to be caught between vehicles



# Loading (Cont)

- Ensure spanners are properly positioned & capable of supporting the heaviest load anticipated
- At least 12" of spanner should overlap the rail car deck
- Most track vehicles don't require spanners between rail cars
- When loading vehicle between railcars of uneven deck heights, be sure to place dunnage under the spanner to prevent it from slipping

**Dunnage**





# Loading (Cont)

- When driving on spanners, maintain a constant speed.
- Avoid jamming on brakes or reversing





# Vehicle Spacing

- Vehicles require a minimum of 10 inches of space between vehicles.
- Ensure sufficient space around top mounted brake wheels for operation



**Wrong spacing**



# Loading Multilevel Cars

- Exercise caution when loading vehicles on or moving vehicles through multilevel rail cars. Check deck heights.
- Decks may be different heights causing vehicle to strike the upper deck.





# Setting Vehicles

- After positioning vehicle on railcar, vehicle operator:

Places transmission in neutral, secure with wire

Sets parking brake, secure with wire

Places battery switches in “off” position

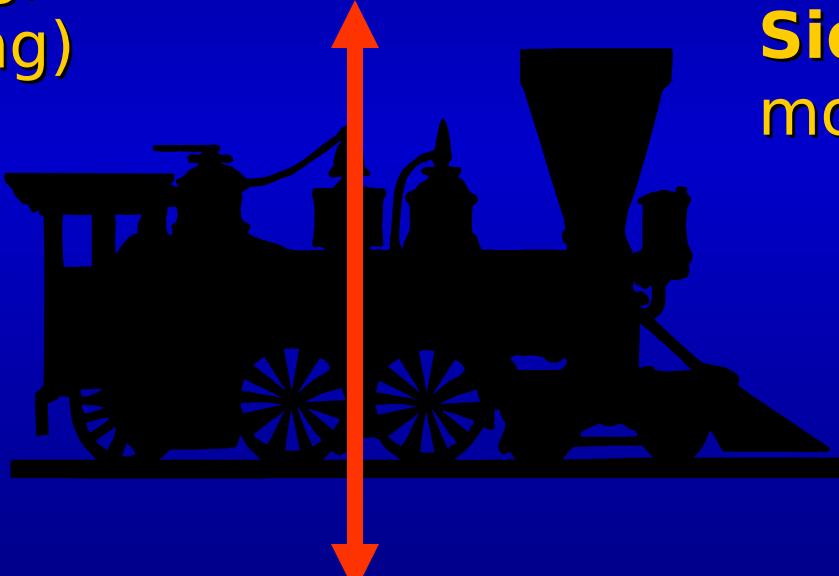


# Force Applied to Railcar Loads

**Front to back**  
movement (coupling,  
start-up and stopping)



**Vertical** movement  
(dips in track)



**Side to side**  
movement (curves)



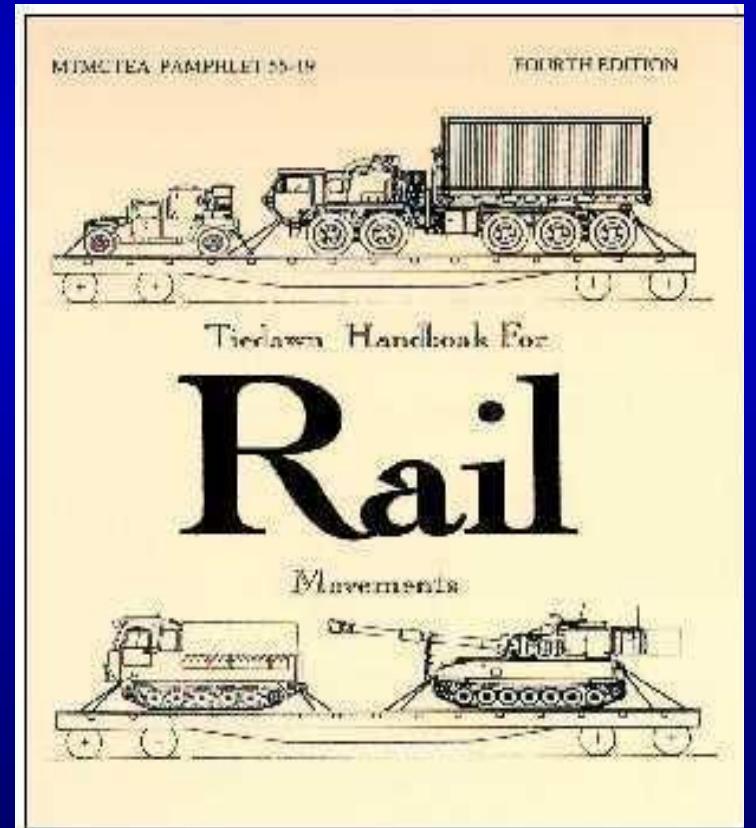
**THIS IS WHY WE TIE DOWN VEHICLES/EQUIPMENT**



# Tie-down Procedures

- When securing vehicles use these techniques:

- Inspect chain assemblies and components (for damage, missing parts and proper operation)
- Apply chains in pairs and equal numbers front and rear





# Tie-down Procedures

(cont)

- Ensure in turntable type winches that the chain is taken up on the underside of the rail



Backwards



Proper Position



# Tie-down Procedures (Cont)



## ■ Ensure proper wire or chain tension

- Place tension on chain or wire rope to allow no more than one inch deflection when supporting the weight of a full grown man





# Tie-down Procedures (Cont)



- Secure excess wire rope or chain to the tension bearing part of the wire rope.
- On chain devices, secure open-faced hooks to chain link with wire or nylon tie strap.
- Lock chain-tightening device with wire.
  - Turnbuckles must have jamnuts tightened wrench-tight using two wrenches



# Tie-down Procedures (Cont)



- Secure chain through tie-down points at forty-five degree angles
- Pull chain tight as possible, ensuring that there are no twists or kinks, and secure chain hook to chain.





# Tie-down Procedures (Cont)



- Hand tighten turnbuckles first, then continue to tighten with open end or crescent wrench until 1/8 inch of the rubber compression ring shows.
  - Store used chain assemblies in the rail car channel



# Loading and Tie-down Checklist

- Checklists should be distributed to the loading

## the team follow

### Loading and Tiedown Checklist For Vehicles on Chain Tiedown Flatcars

NOTE: Copies of this page should be distributed to loading teams.

- Make certain all hood latches are secured.
- Leave at least 10 inches between vehicles.
- Check for proper brake wheel clearance.
- Do not cross the chains.
- Use symmetrical tiedown patterns.
- Secure tiedowns at approximately 45° angles.



# Loading and Tie-down Checklist (Cont)

- **Checklist Cont:**

- Seat and lock chain anchor or winch.
- Secure shackle in tiedown provision with wire tie or cotter pin.
- Pull chain tight and attach hook above the compression unit.
- Tighten chain.
- Use appropriate tool.
- Make sure chain is not kinked or binding.



# Loading and Tie-down Checklist (Cont)

- Checklist Cont:

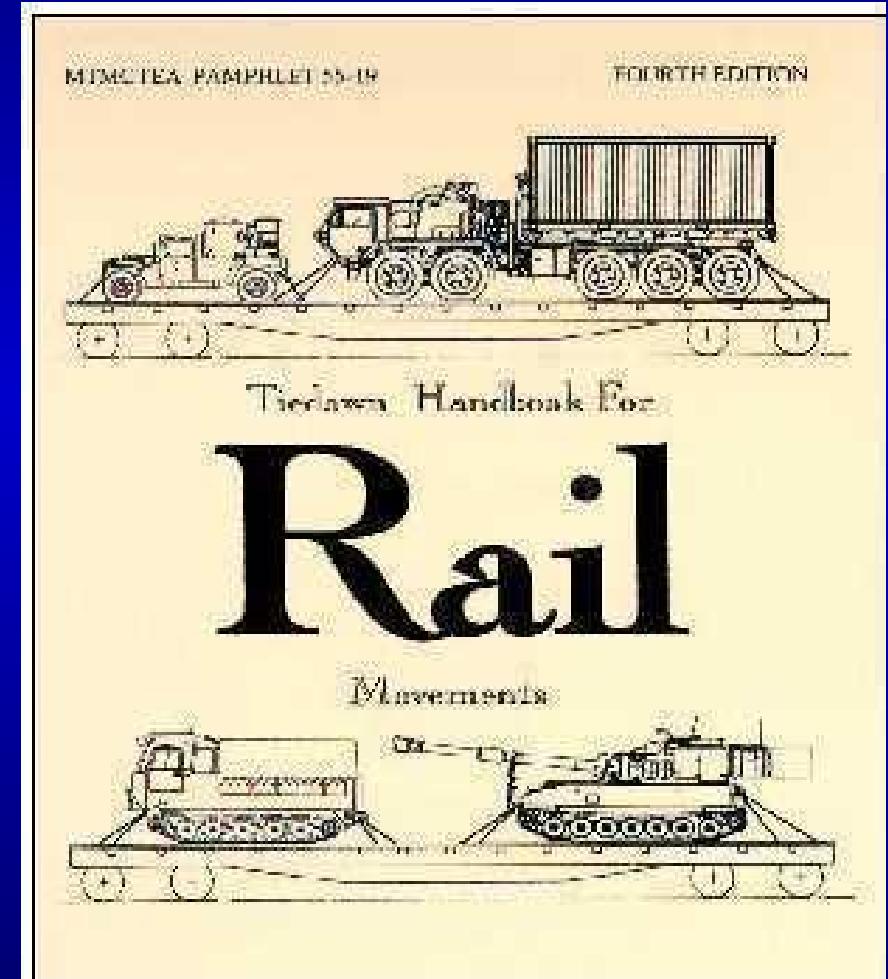
- Secure hooks with wire or nylon tie straps.
- Make sure turnbuckles are wired or locked.
- Tighten jammuts with two wrenches.
- Do not secure chains to axles or springs unless figure shows to.
- Make certain turrets and guns, radiator doors, side skirts, outriggers, crane booms, expandible van bodies, and so forth are secured from extending up or over the side of the flatcar.



# TEA PAM 55-19



- **App A:** Trucks and Trailers
- **App B:** Tracked and Wheeled Armored Vehicles
- **App C:** MHE & Construction Equip. & Non-Vehicles
- Distribute check lists for tie-down procedures on page 34 and for 40000-series Flatcars





# Trucks up to 80,000 lbs

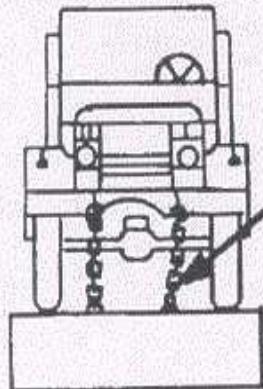
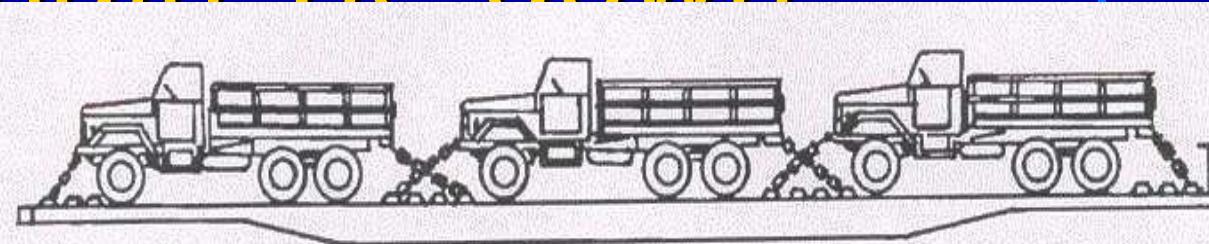
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## Chain Tie-down

- Alloy Steel  
Chain 3/8" and 1/2"

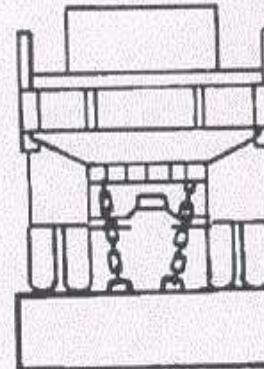


- TEA PAM  
55-19  
App A  
page A-2



FRONT VIEW

Steel chain (see below  
for number required)



REAR VIEW



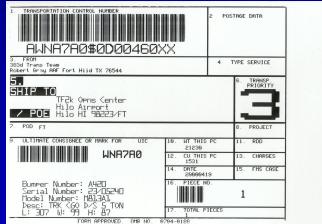
# Final Inspection

- Final inspection is made after the railcars are loaded to ensure that the contents are loaded, blocked and braced in compliance with AAR loading rules.
- The rail representative is the final approving authority for





# Intransit Visibility



MSL

Reader

TC-AIMS II

GTN



ITV Regional Server



# Unloading



- Railcars off-loaded promptly at POE to allow return for further use and to avoid demurrage or detention charges (usually within 48 hrs)
- Units must remove blocking, dunnage and banding from unloaded cars before release to the carrier



# SUMMARY



# QUESTIONS ???





# On Learning

# FINAL REVIEW



# Next Lesson ....



# TAKE A BREAK!

